

# Implementation Plan for Hoffler Creek

Technical Advisory Committee Meeting

2/10/2012



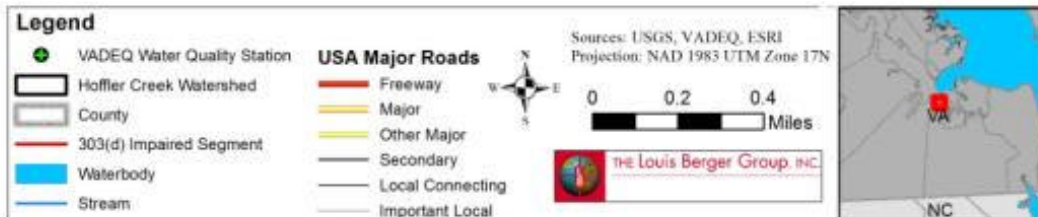
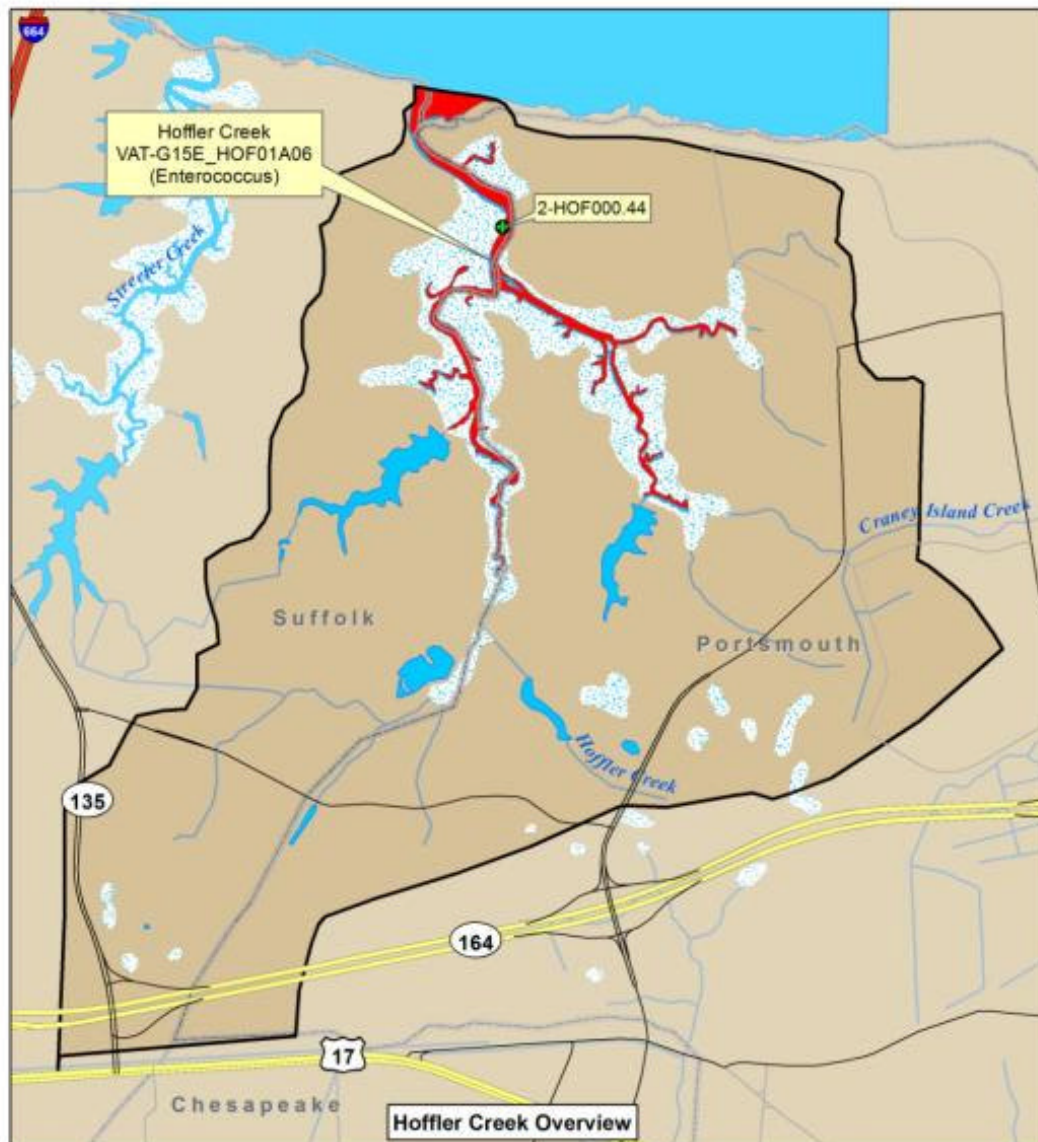
# Agenda

- TMDL Review
- Implementation Plan Approach
- Implementation Actions
- Units, and Costs
- Measurable Goals and Milestones
- Timeline of Implementation
- Funding Sources

# Overview of the Watershed

**Hoffler Creek Total area:  
1,781 acres**

➤ **Located within the Cities  
of Suffolk and Portsmouth**



# **Bacteria Water Quality Standards**

VADWQ specifies the following criteria (9 VAC 25-260-170) for recreational waters:

Enterococci:

- 35 cfu/100ml (geometric mean: applies to 4 or more samples obtained in 1 calendar month)
- 104 cfu/100mL (no more than 10% of the total samples shall exceed)

# Bacteria Impairments and Data Summary

Based on VADEQ 2010 303(d) List

## ➤ Impaired Use: Recreation

Cause Group ID	Assessment Unit	Stream Name	Impairment for	Area (mi <sup>2</sup> )
VAT- G15E-06-03-BAC	VAT- G15E_HOF01A06	Hoffler Creek	Enterococcus	0.06

### Summary of VA DEQ Enterococci Exceedances in the Hoffler Creek Watershed

Station ID	Number of Samples	Dates Sampled		CFU/ 100 mL		Total Exceed.*	Total % Exceed.
		First	Last	Min	Max		
2-HOF000.44	21	8/18/2005	12/9/2009	25	2000	10	48%

\*Exceedances of the Enterococci criterion of 104 CFU/100mL

# Estimation of Bacterial Contribution

- EPA Bacterial Indicator Tool
  - Spreadsheet model under Microsoft EXCEL
  - Estimates daily accumulated bacteria loads per non-point source
  - Results:

Estimated Bacterial Contribution by Source				
Livestock	Wildlife	Failed Septic	Pets	SSO's
0.0%	24.6%	0.0%	71.9%	3.5%

# TMDL Expression

$$\text{TMDL} = \sum \text{LA} + \sum \text{WLA} + \text{MOS}$$

LA = Load allocation (nonpoint source contribution)

WLA = Waste load allocation (point source contribution)

MOS = Margin of safety

# Hoffler Creek Allocations

## Load Allocation (Rural Sources)

Source	Distribution	Existing Load (Counts/day)	Allocated Load (Counts/day)	Required Reduction
Livestock	0.0%	0.00E+00	0.00E+00	-
Wildlife	24.6%	1.44E+12	2.57E+11	82%
Failed Septic System	0.0%	0.00E+00	0.00E+00	-
Pets	71.9%	4.06E+12	0.00E+00	100%
SSOs	3.5%	2.06E+11	0.00E+00	100%
<b>Total</b>	<b>100.0%</b>	<b>5.87E+12</b>	<b>2.57E+11</b>	<b>96%</b>

## Waste Load Allocations (MS4s, urban areas)

MS4	Permit #	Existing Load	Allocated Load	Percent Reduction
		(counts/day)	(counts/day)	(%)
City of Portsmouth	VA0088668	7.60E+12	3.34E+11	95.6%
City of Suffolk	VAR040029	4.62E+12	2.03E+11	95.6%
VDOT	VAR040115	*	*	*
	Future Growth		2.57E+09	
	<b>Total</b>	<b>1.22E+13</b>	<b>5.39E+11</b>	<b>95.6%</b>

\*VADEQ recommended the aggregation of the VDOT's MS4 WLA with Portsmouth and Suffolk's MS4 WLA



# Hoffler Creek Allocations

## TMDL Allocation Plan Loads (Counts/day)

WLA (MS4s within urban area and 1% of LA for future growth)	LA (SSOs, Non MS4s and non-urban MS4s)	MOS (Margin of Safety)	TMDL
5.39E+11	2.57E+11	IMPLICIT	7.96E+11

**The Hoffler Creek Bacteria TMDL was  
approved by EPA in December 2011.**

# Implementation Plan Strategy

- Strategy focused to limit anthropogenic bacteria in Hoffler Creek and consists of:
  - Pollution Prevention
  - Mitigation Measures
  - Indirect Measures
- Will focus on the controllable loads of bacteria from pet waste and SSOs
  - No bacteria contributions from septic systems or livestock.

# Pollution Prevention

- **Pollution Prevention** targets bacteria at its source.
- If bacteria are prevented from entering surface water the absent bacteria will not contribute to the bacteria levels in the watershed.
- The pollution prevention efforts in this plan primarily target human and canine sources of bacteria loading and include:
  - Sanitary Sewer Maintenance
  - Proper Pet Waste Disposal
    - Dog Parks
    - Pet Waste Stations

# **Pollution Prevention - SSOs**

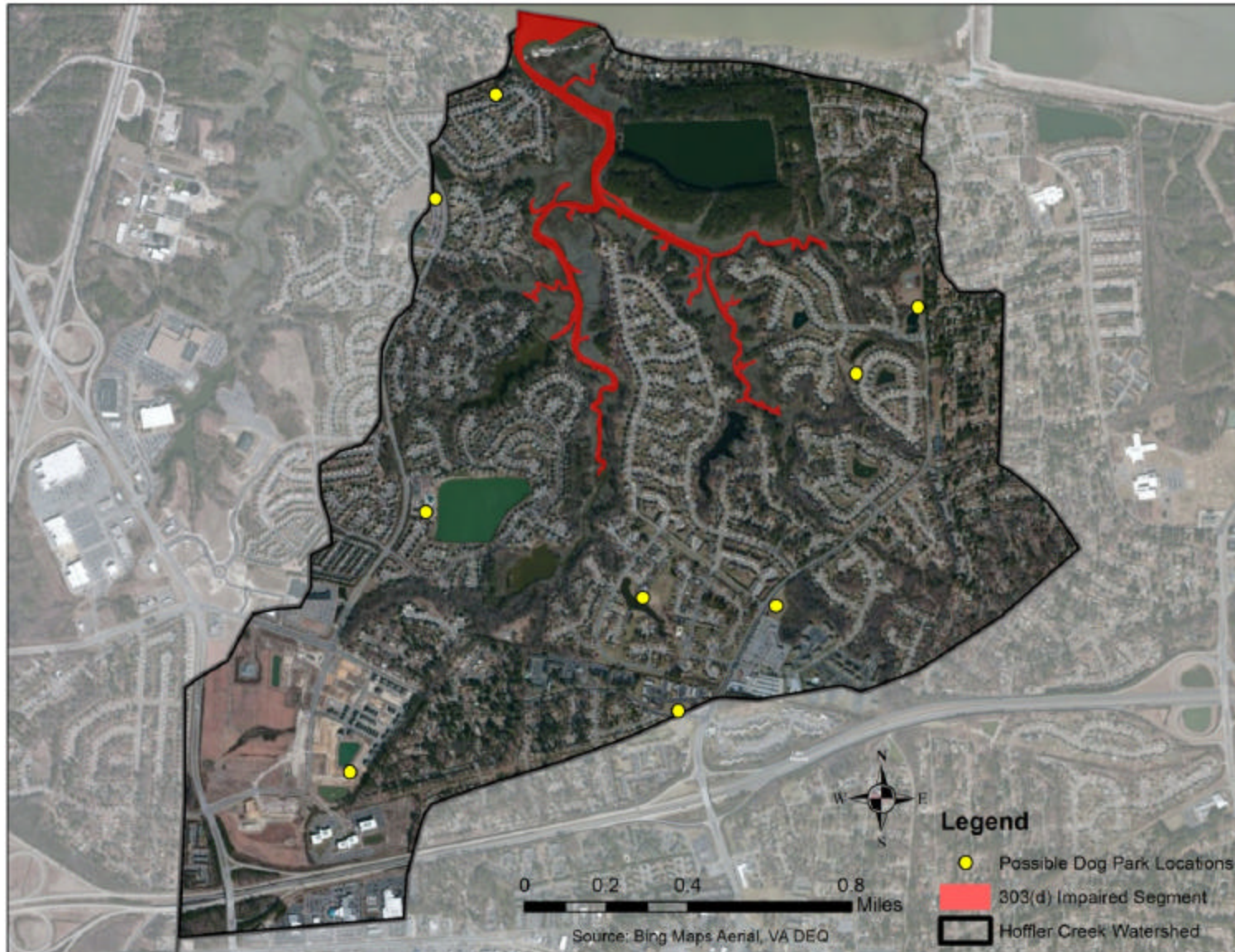
- **Sanitary Sewer Overflow Evaluation and Maintenance**
  - Plan outlines the Consent Orders for municipalities to evaluate their collection system and develop plans to eliminate SSOs
  - Final plan required by the consent order is submittal of the Regional Wet Weather Management Plan by November 26, 2013

# Proper Pet Waste Disposal

- **Dog Park Construction**

- Dog parks can be regarded as Best Management Practices (BMPs) themselves since the environment of the dog park encourages patrons to pick up after their pets.
- IP suggests creation of 9 dog parks
  - Approximately 1 acre each
  - Consisting of fencing, benches, a water fountain, a pet waste composter, and a water spigot for dog water bowls

# Possible Dog Park Locations



# Proper Pet Waste Disposal

- **Pet Waste Stations**

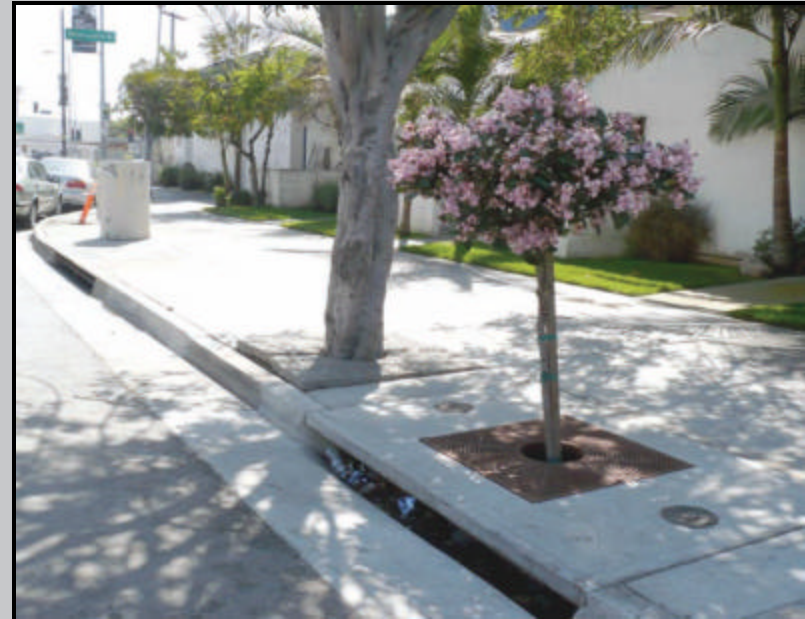
- Place dog waste stations throughout the watershed, first on the main arteries, then deeper into neighborhoods.
- Frequency of 3 per mile
- Estimated 37.6 miles of road in Hoffler Creek watershed, for a total of 113 pet waste stations at full implementation





# Mitigation Measures

- **Mitigation Measures** remove bacteria already deposited in the watershed, which stormwater runoff transports to the impaired stream.
- The majority of Hoffler Creek watershed is developed (72%), indicating Low-Impact-Development (LID) BMPs would be most appropriate.
  - Tree box filters installed to existing curb inlets.
  - Advances in technology have lead to media development which has a 95% removal efficiency for bacteria





# Mitigation Measures - Quantification

- Frequency of curb inlets is one every 300 ft (internal estimate)
  - Indicating a total of 662 curb inlets in Hoffler Creek.
- Approximately 160 acres of roads draining to curb inlets in Hoffler Creek watershed.
  - Indicating each curb inlet drains approx.  $\frac{1}{4}$  acre of impervious land
- Tree box filters vary in size but typical tree box filters treat  $\frac{1}{2}$  acre of impervious land.
- Tree box filters could be installed in an iterative process, starting with a tree box filter every 6<sup>th</sup> inlet, then every 4<sup>th</sup> inlet, and finally every 2<sup>nd</sup> inlet.

# Indirect Measures

- **Indirect Measures** will not immediately affect bacteria levels in Hoffler Creek.
- These indirect measures intend to change behaviors and attitudes of watershed citizenry through outreach and education. The indirect measures to be considered by this plan include the following:
  - Pet Waste Education Program
  - Signage



# Units and Costs

Category	IP Action	Unit	Number of Units	Cost per Unit	Total Cost	Source
Pollution Prevention	Sanitary Sewer Overflow Program	Program	1			
	Dog Park Construction/Maintenance	Park	9	\$28,000	\$252,000	PACES, 2011
	Pet Waste Stations (w/ maintenance)	System	113	\$260	\$29,380	Zero Waste USA, 2011
Mitigation Measures	Tree Box Filters (w/ maintenance)	System	331	\$10,500	\$3,476,323	Fairfax County, 2005
Indirect Measures	Pet Education Program	Program	1	\$3,750	\$3,750	Maptech, 2006
	Signage	Sign	463	\$5	\$2,316	USA Blue Book, 2012
Technical Assistance	Residential BMPs and Education	person-years	10	\$25,000	\$250,000	DCR, 2009
				<b>Total Cost</b>	<b>\$4,013,769</b>	

# Benefits

- Primary benefit for executing this implementation plan will be the lowering of bacteria levels in Hoffler Creek
  - With the possibility of removing Hoffler Creek from the Virginia State Impaired Waters List
- Secondary benefits include:
  - Synergies developed with related programs and projects and the watershed-wide incorporation of the bacteria issue into nonpoint source pollution outreach efforts.
  - Reduction in nutrients and sediment from Tree box filter implementation
    - Reduce these pollutants to the Chesapeake Bay

# Measureable Goals/Milestones

- Primary Goal is to de-list the bacteria impaired Hoffler Creek
- A Staged Approach to Implementation
  - Will allow for evaluation of progress in water quality improvement
  - 1<sup>st</sup> stage is years 1-4 (2012-2015)
  - 2<sup>nd</sup> stage is years 5-7 (2016-2018)
  - 3<sup>rd</sup> stage is years 8-10 (2019-2021)

# Staged Implementation

Staged Implementation Actions						
IP Action Category	Specific IP Actions	Unit	Stage I (Y1-Y4) (2012-2015)	Stage II (Y5-Y7) (2016-2018)	Stage III (Y8-Y10) (2019-2021)	Total
Pollution Prevention	Sanitary Sewer Overflow Program	Program	1	ongoing	ongoing	1
	Dog Park Construction	Park	5	2	2	9
	Pet Waste Stations	System	68	23	23	113
Mitigation Measures	Tree Box Filters	System	110	55	166	331
Indirect Measures	Pet Education Program	Program	1	1	1	3
	Signage	Sign	185	139	139	463
Technical Assistance		person-years	4	3	3	10

Staged Implementation Actions - Costs						
IP Action Category	Specific IP Actions	Unit	Stage I (Y1-Y4) (2012-2015)	Stage II (Y5-Y7) (2016-2018)	Stage III (Y8-Y10) (2019-2021)	Total
Pollution Prevention	Sanitary Sewer Overflow Program	Program				
	Dog Park Construction	Park	\$140,000	\$56,000	\$56,000	\$252,000
	Pet Waste Stations	System	\$17,628	\$5,876	\$5,876	\$29,380
Mitigation Measures	Tree Box Filters	System	\$1,158,774	\$579,387	\$1,738,161	\$3,476,323
Indirect Measures	Pet Education Program	Program	\$1,250	\$1,250	\$1,250	\$3,750
	Signage	Sign	\$927	\$695	\$695	\$2,316
Technical Assistance		person-years	\$100,000	\$75,000	\$75,000	\$250,000
		Total Cost	\$1,418,579	\$718,208	\$1,876,982	\$4,013,769

# Water Quality Milestones and Timeline

Water Quality Milestones for Hoffler Creek	
<b>Current Exceedance Rate of Instantaneous Standard for Enterococci (104 CFU/100mL)</b>	48
<b>Stage I (Y1-Y4) Exceedance Rate</b>	33
<b>Stage II (Y5-Y7) Exceedance Rate</b>	23
<b>Stage III (Y8-Y10) Exceedance Rate</b>	9

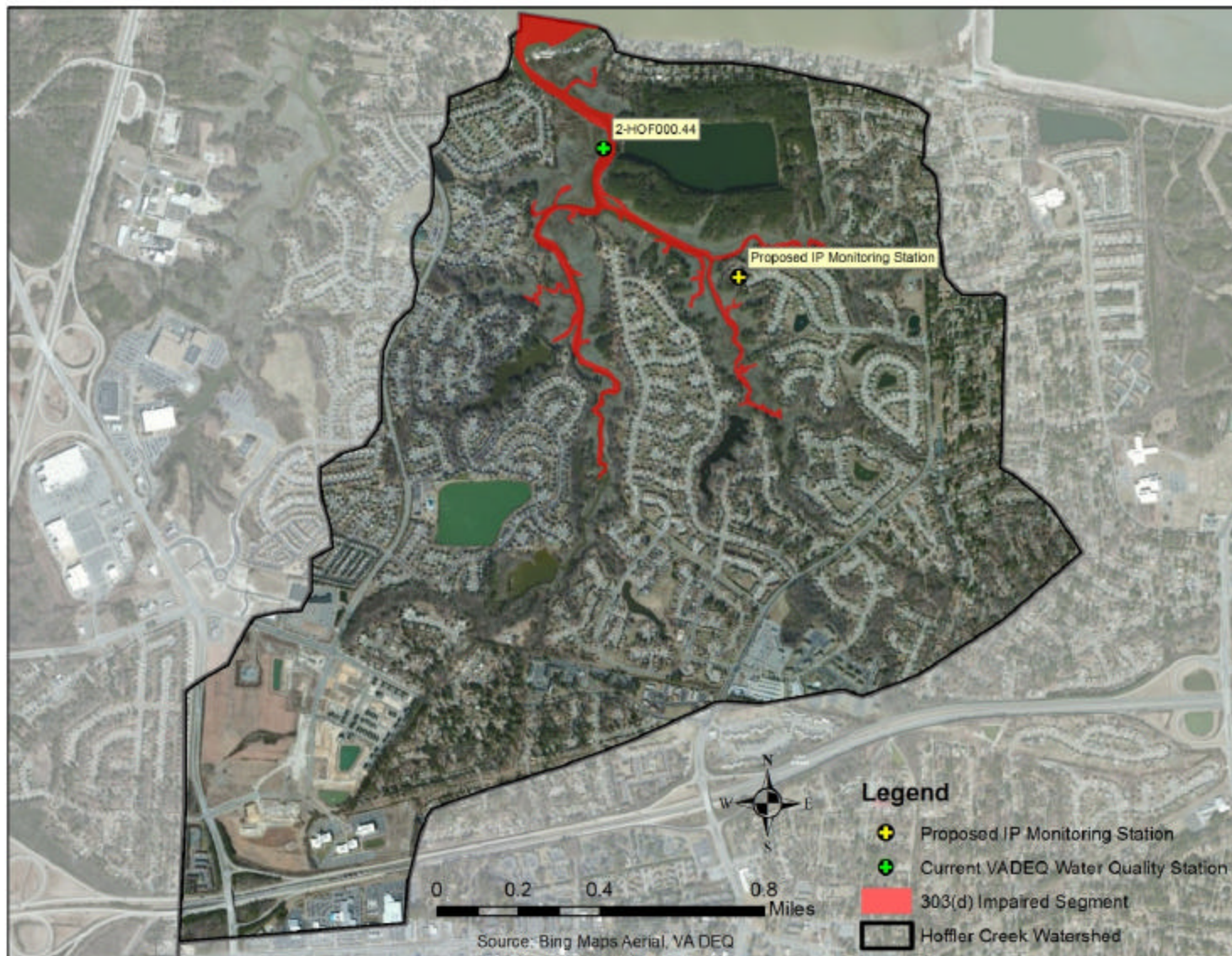
Staged Implementation Actions % Implemented and Timeline					
IP Action Category	Specific IP Actions	Unit	Stage I (Y1-Y4) (2012- 2015)	Stage II (Y5-Y7) (2016- 2018)	Stage III (Y8-Y10) (2019- 2021)
Pollution Prevention	Sanitary Sewer Overflow Rehabilitation	Program	HRSD	HRSD	HRSD
	Dog Park Construction	Park	55.56%	22.22%	22.22%
	Pet Waste Stations	System	60.00%	20.00%	20.00%
Mitigation Measures	Tree Box Filters	System	33.33%	16.67%	50.00%
Indirect Measures	Pet Education Program	Program	ongoing	ongoing	ongoing
	Signage	Sign	40.00%	30.00%	30.00%
Technical Assistance		person-years	40.00%	30.00%	30.00%
<b>Exceedance Rate</b>			<b>33</b>	<b>23</b>	<b>9</b>

# Monitoring

- VADEQ will continue monitoring bacteria levels in Hoffler Creek throughout the implementation plan.
- Allows for monitoring of improvement of water quality, a barometer for implementation success
- Adding another monitoring station allows for targeting of IP actions through estimation of bacterial contribution from different branches of Hoffler Creek.



# Monitoring Sites



# **Funding Sources**

- **USDA Programs - CREP/EQIP**
- **EPA Section 319 Funds**
- **Water Quality Improvement Fund**
- **State Revolving Loan Funds**
- **State Cost-Share Program**
- **State Tax Credits**
- **National Fish & Wildlife Foundation**

# **Next Steps - Implementation**

- **Revise Draft Implementation Report**
- **Final Public Meeting on March 13<sup>th</sup>, 2012**

# TMDL Contacts



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